

REMARKS

Reconsideration and allowance of the present patent application based on the foregoing amendments and following remarks are respectfully requested.

By this Amendment, claim 13 and the Title of the Invention are amended. No new matter is added. Accordingly, after entry of this Amendment, claims 1-21 will remain pending in the patent application.

In the Office Action, the Title of the Invention and claim 13 were objected to. In response, the Title of the Invention and claim 13 are amended in the manner suggested by the Examiner. Accordingly, reconsideration and withdrawal of the objection to the Title of the Invention and claim 13 are respectfully requested.

Claims 2, 12 and 14-21 were rejected under 35 U.S.C. §102(b) based on Hansler (U.S. 4,935,668). The rejection is respectfully traversed.

Claim 2 is patentable over Hansler at least because this claim recites a high-intensity discharge lamp including an arc tube wherein, *inter alia*, the discharge chamber is filled with a discharge medium including a metal halide and a starting gas, and wherein said metal halide comprises at least halides of Na, Tl, In, and Tm. Hansler does not disclose, teach or suggest these features.

Hansler discloses a light source 16 that contains a fill consisting of mercury and a metal halide. Hansler discloses that the metal halide is a mixture of an amount in the range of about 2mg to 50mg and comprises halides selected from the group given in Table I. (*See* col. 5, lines 25-65).

However, unlike claim 2, Hansler is silent as to a mixture that includes the specific combination of halides recited in claim 2. Hansler merely discloses a genus that includes a list of metal halides, i.e., Sodium Iodine, Scandium Iodine, Thallium Iodine, Indium Iodine, Tin Iodine, Dysprosium Iodine, Holmium Iodine, Thulium Iodine, Thorium Iodine, Cadmium Iodine and Cesium Iodine, and teaches that the metal halide includes halides (i.e. at least two halides) selected from this list. Hansler does not disclose, teach or suggest the particular species recited in claim 2 and, as such, cannot anticipate claim 2.

Specifically, Applicants respectfully note that over 500 combinations ($\sum_{i=2}^9 C_i^9 = 502$) of at least two metal halides could be created with the list of metal halides disclosed by Hansler. Furthermore, over 380 combinations of at least 4 elements and 126 combinations of

exactly 4 elements could be created with this list of metal halides. Accordingly, because (a) Hansler does not name the specific species recited by claim 2, (b) a vast number of species could be created based on the list (genus) disclosed by Hansler, and (c) Hansler fails to describe any of the combinations that could be created based on this list, Applicants respectfully submit that Hansler cannot anticipate claim 2. (See MPEP 2131.02, citing In Re Petering, 301 F.2d 676, 133 USPQ 275 (CCPA 1962)). For at least this reason, Applicants respectfully request that the anticipatory rejection of claim 2 be withdrawn.

In addition, Applicants respectfully submit that claim 2 is not rendered obvious based on Hansler at least because Hansler fails to recognize the criticality of the mixture of metal halides used in the discharge lamp. As explained, for example, in paragraph [0017] of the specification, a lighting device including a metal halide that comprises at least halides of Na, Tl, In, and Tm possesses unexpected results relative to the prior art emission properties in terms of light luminous efficiency, correlated color temperature, color rendition, life and low variation in correlated color temperature and chromaticity with operating positions. Because Hansler is silent as to criticality of the mixture of metal halides, claim 2 cannot be rendered obvious based on Hansler. (See MPEP 716.02(a)).

Claims 12 and 14-21 are patentable over Hansler at least by virtue of their dependency from claim 1 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 2, 12 and 14-21 under 35 U.S.C. §102(b) based on Hansler are respectfully requested.

Claims 1, 3-11 and 13 were rejected under 35 U.S.C. §103(a) based on Hansler. The rejection is respectfully traversed.

Claim 1 recites a high-intensity discharge lamp including an arc tube wherein, *inter alia*, the discharge chamber is filled with a discharge medium including a metal halide and a starting gas, said metal halide comprising at least halides of Na, Tl, and Tm, and wherein the ratio (MTm/M) of the mass MTm of Tm halide to the total mass M of said metal halide is within a range of about $0.4 \leq MTm/M \leq 0.9$. Applicants respectfully submit that these features are not obvious for at least the following reasons.

First, Hansler is silent as to a mixture that includes the specific combination of halides recited in claim 1. As mentioned previously, Hansler merely discloses a genus that includes a list of metal halides, i.e., Sodium Iodine, Scandium Iodine, Thallium Iodine, Indium Iodine, Tin Iodine, Dysprosium Iodine, Holmium Iodine, Thulium Iodine, Thorium Iodine, Cadmium Iodine and Cesium Iodine, and teaches that the metal halide includes halides (i.e. at least two

halides) selected from this list. Hansler does not disclose, suggest or even hint at the particular species recited in claim 1 and, as such, cannot anticipate claim 1.

As mentioned previously, over 500 combinations of at least two metal halides could be created with the list of metal halides disclosed by Hansler. Among these over 500 combinations, over 460 combinations (466) of at least 3 elements and 84 combinations of exactly 3 elements could be created with this list of metal halides. Accordingly, because (a) Hansler does not name the specific species recited by claim 1, (b) a vast number of species could be created based on the list (genus) disclosed by Hansler, and (c) Hansler fails to describe any of the combinations that could be created based on this list, Applicants respectfully submit that Hansler cannot render obvious claim 1. (*See* MPEP 2131.02, citing *In Re Petering*, 301 F.2d 676, 133 USPQ 275 (CCPA 1962)).

The Examiner alleged that it would have been obvious to one having ordinary skill in the art to provide the mass ratio recited in claim 1 "since where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation (MPEP 2144.05 II)." Applicants respectfully disagree and note that "evidence that a compound is unexpectedly superior in one of a spectrum of common properties . . . can be enough to rebut a *prima facie* case of obviousness." (*See* MPEP 716.02(a), citing *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987)). Furthermore, "presence of a property not possessed by the prior art is evidence of nonobviousness" (*See* MPEP 716.02(a) citing *In re Papesch*, 315 F.2d 381, 137 USPQ 43 (CCPA 1963)).

As mentioned previously, Hansler fails to recognize the criticality of the mixture of metal halides used in the discharge lamp. A lighting device including a metal halide that comprises halides of Na, Tl, and Tm with a mass ratio of claim 1 possesses unexpected results relative to the prior art emission properties in terms of light luminous efficiency, correlated color temperature, color rendition, life and low variation in correlated color temperature and chromaticity with operating positions. Specifically, Applicants respectfully submit that the claimed mass ratio provides unexpected results over the prior art because, since ceramics are inactive to Thulium, a sufficient amount of Thulium halide that exhibits blue ray illumination can be filled in the ceramic discharge to obtain white coloring of illumination in combination with Na (red) and Tl (green). Because Hansler is silent as to the criticality of the mixture of metal halides and the mass ratio of Thulium to improve the illumination characteristics, claim 1 cannot be rendered obvious based on Hansler. (*See* MPEP 716.02(a)).

Claims 3 and 7(4)(1), 7(5)(1), 9(1), 10(1), 11 and 13(1) are patentable over Hansler at least by virtue of their dependency from claim 1, and for the additional features recited therein.

Claims 4, 5, 7(2) and 13(2) are patentable over Hansler at least by virtue of their dependency from claim 2, and for the additional features recited therein. As mentioned previously, claim 2 is not rendered obvious by Hansler. As such, claims 4 and 5 are allowable.

Claim 6 recites a high-intensity discharge lamp including an arc tube wherein, *inter alia*, the discharge chamber is filled with a discharge medium including a metal halide and a starting gas, the metal halide comprising at least halides of Na, Tl, In, and Tm, wherein the ratio (MT_m/M) of the mass MT_m of said Tm halide to the total mass M of said metal halide is within a range of about $0.4 \leq MT_m / M \leq 0.9$, and wherein the total mass of the halides of Na, Tl, In, Tm is greater than 90% of the total mass M of the metal halide. For similar reasons as provided above in claims 1 and 2, Applicants respectfully submit that Hansler cannot render obvious the features of claim 6.

Claims 8 and 13(6) are patentable over Hansler at least by virtue of their dependency from claim 6, and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 1, 3-11 and 13 under 35 U.S.C. §103(a) based on Hansler are respectfully requested.

Claim 13 was rejected under 35 U.S.C. §103(a) based on Hansler in view of Higashi (U.S. Pat. No. 4,024,425). The rejection is respectfully traversed.

Claim 13(1) is patentable over Hansler at least because this claim recites a high-intensity discharge lamp including an arc tube wherein, *inter alia*, the discharge chamber is filled with a discharge medium including a metal halide and a starting gas, said metal halide comprising at least halides of Na, Tl, and Tm, and wherein the ratio (MT_m/M) of the mass MT_m of Tm halide to the total mass M of said metal halide is within a range of about $0.4 \leq MT_m/M \leq 0.9$. Claim 13(2) is patentable over Hansler at least because this claim recites a high-intensity discharge lamp including an arc tube wherein, *inter alia*, the discharge chamber is filled with a discharge medium including a metal halide and a starting gas, and wherein said metal halide comprises at least halides of Na, Tl, In, and Tm. Claim 13(6) is patentable over Hansler at least because this claim recites a high-intensity discharge lamp including an arc tube wherein, *inter alia*, the discharge chamber is filled with a discharge medium including a metal halide and a starting gas, the metal halide comprising at least halides of Na, Tl, In, and Tm, wherein the ratio (MT_m/M) of the mass MT_m of said Tm

halide to the total mass M of said metal halide is within a range of about $0.4 \leq MT_m / M \leq 0.9$, and wherein the total mass of the halides of Na, Tl, In, and Tm is greater than 90% of the total mass M of the metal halide.

As mentioned previously, Applicants respectfully submit that these features are not rendered obvious in view of Hansler.

Higashi fails to remedy the deficiencies of Hansler. Higashi merely discloses a metal halide lamp but is silent as to the recited metal halides of claims 13(1), 13(2) and 13(6), much less the mass ratio recited by claims 13(1) and 13(6). As such, any reasonable combination of Hansler and Higashi cannot result, in any way, in the invention of claim 13.

Accordingly, reconsideration and withdrawal of the rejection of claim 13 under 35 U.S.C. §103(a) based on Hansler in view of Higashi are respectfully requested.

Applicants have addressed all the Examiner's rejections and respectfully submit that the application is in condition for allowance. A notice to that effect is earnestly solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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